

Space-Ready Advanced Imaging System, Phase II

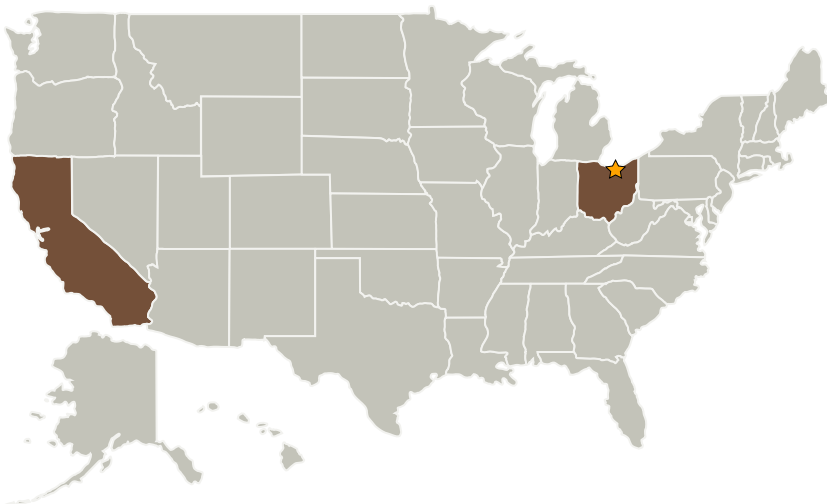
Completed Technology Project (2007 - 2009)



Project Introduction

In this Phase II effort Toyon will increase the state-of-the-art for video/image systems. This will include digital image compression algorithms as well as system level integration, encompassing the image sensor all the way to compressed imagery data transport. To accomplish these goals Toyon will design a complete FPGA-based video compression system. The novel aspect of this design lies in the dynamically reconfigurable hardware IP cores that will interface to an embedded processor. Similar to a software defined radio (SDR) system where separate RF waveforms are loaded at runtime, Toyon aims to reload separate image compression encoders. This enables the use of several different image/video compression standards, all on the same hardware platform. The dynamically reconfiguring architecture of this system enables a single image sensor and hardware platform to handle the two most common space video camera applications, while still maintaining low power consumption in a highly integrated package. First, H.264 for high framerate, real-time video for situational awareness and surveillance. Second, lossless JPEG200 encoding for scientific and research post-processing. However, due to limited funds for this Phase II design, we will most likely work with a purchased H.264 IP core along with a standard JPEG compression core, which Toyon developed on the Phase I of this program. Providing the capability to reconfigure for both motion video and still image compression will provide near-term utility and demonstrate feasibility for Phase III development. Toyon will target the solution to a custom fully radiation hardened hardware platform. Potential radiation hardened components include a Xilinx FPGA, Xilinx PROM, Atmel SRAM memory, Aeroflex voltage regulators, and a Cypress CMOS image sensor paired with space-ready optics.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Toyon Research Corporation	Supporting Organization	Industry	Goleta, California

Primary U.S. Work Locations

California	Ohio
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Project Transitions

 **December 2007:** Project Start **December 2009:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.2 Avionics Systems and Subsystems
 - └ TX02.2.7 Data Reduction Hardware Systems